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19 November 1959

FILED
178B
Destroyer Systems
File

MEMORANDUM FOR: Chief, WE/6

ATTENTION

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SUBJECT

: Data on Air-Fed Incinerator

1. As per the conversation between [redacted] of this office, we are forwarding the following information. If we can be of any further assistance or if a demonstration of this incinerator is desired, please notify the undersigned or [redacted].
2. The first prototype model of the new air-fed incinerator has been completed and tested. A second prototype model with some minor improvements is nearing completion. Both of these models are based on the same principle, known as the cyclone down-jet principle.
3. Basically this incinerator consists of two metal shells, a grid, a motor blower, ducting to carry air from the motor blower to the burning chamber, and a stack for the emission of hot gases. The outer shell is fabricated from plain carbon steel. The inner shell, which is somewhat fancier in design, is fabricated from a 310 stainless steel. It is four inches in diameter less than the outer shell and contains both louvers and air nozzles. The louvers are for the purpose of maintaining a thin film of air around the inside of the inner liner for skin cooling of this liner. Four nozzles are installed at each of three horizontal levels. Each nozzle is 1-1/8 inches in I. D. and 3 1/4 inches long and is directed toward the central axis of the unit and about 30 degrees downward. Almost the entire length of the nozzles is allowed to project inside of the liner to insure that the main jets of air would not be deflected tangentially by the high swirl velocities which are created by the film-cooling air from the louvers. An upright metal cone, 18 inches in diameter at the base and 7 inches high, is formed at the bottom of the combustion chamber. This cone is formed by stacking three sections separated by 1/16 inch gaps to provide for film cooling air to flow downward and outward along the conical surface. The lower wall of the inner shell also tapers inward where it is joined at its lowest edge to the bottom of this cone. This provides a circular V-shaped trough at the bottom of the burning chamber.
4. The grid consists of a Nichrome five wire mesh with a solid base situated at the top of the inner liner. The grid is so constructed to force

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any hot gases or large pieces of fly ash that may rise to the top of the inner chamber to move toward the outside of the chamber and pass through the wire mesh grid before escaping up the stack. This limits the size of any incompletely burned paper particles which can pass out of the burning chamber.

5. The motor blower is an American commercially available industrial exhauster, powered by a 220 Volt, 60 cycle, 3 phase motor, with an impeller diameter of approximately 15 inches which provides 2400 cubic feet per minute air flow and an internal air pressure of seven inches of water inside of the plenum chamber. The ducting need not be of any critical length as long as the air pressure is maintained inside of the plenum chamber.

6. The stack is 16 inches outside diameter. The present stack being used consists of two sections, the first section nearest the burning chamber being fabricated from 304 stainless steel and the second section from plain carbon steel. Stainless steel is required for this first section because any heat generated comes into immediate contact with this section, and erosion would rapidly occur if it consisted of plain steel plate.



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